



CONTRACT NO. DE/2005/04

**SUPPLY AND INSTALLATION OF ELECTRICAL AND MECHANICAL EQUIPMENT FOR
UPGRADING OF TING KOK ROAD PUMPING STATION NO. 5**

ENVIRONMENTAL MONITORING AND AUDIT

MONTHLY EM&A REPORT NO. 11

APRIL 2008

for

Biwater Man Lee Limited

Submitted by

Kingsford Environmental (H.K.) Ltd.

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PROJECT NO.: 81901

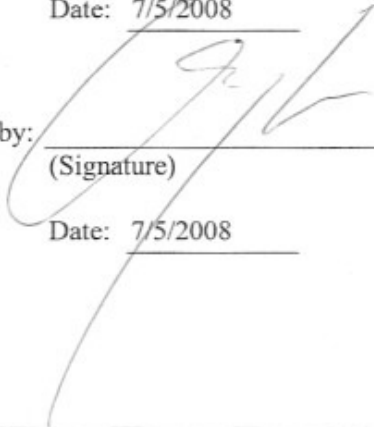
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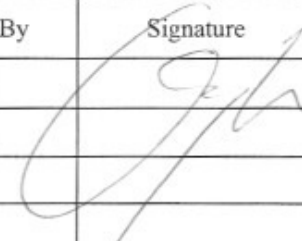
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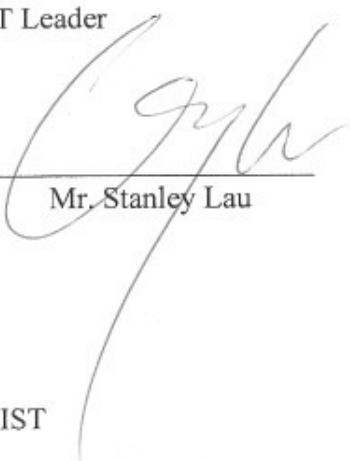
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EXECUTIVE SUMMARY

This is the eleventh monthly Environmental Monitoring and Audit (EM&A) Report for the Drainage Services Department Contract No. DE/2005/04 entitled "Supply and Installation of Electrical and Mechanical Equipment for Upgrading of Ting Kok Road Pumping Station No. 5". This report contains the results of the landfill gas monitoring and environmental auditing for verification of mitigation implementation conducted by the Landfill Gas Team (LGT) of the E&M Contractor, Biwater Man Lee Limited, as required in the contract.

For the landfill gas monitoring activities, Action and Limit (A/L) Levels are defined levels of impact recorded which represent levels at which a prescribed response is required. Action Limit Level is provided by the baseline monitoring results documented in the baseline monitoring report (Report No. EA01284R002) for the Project. The A/L Level for the methane are 0.5%/1.0%, the A/L Level for the carbon dioxide are 0.5%/1.5% and the A/L Level for the oxygen are 19.0%/18.0%.

The works activity for April 2008 included the defect rectification, outstanding minor works and provision of emergency call services for the Pumping Station was conducted.

This report recorded the results and findings of the required EM&A works undertaken during April 2008. Note that no excavation work and construction work are carried out by Biwater Man Lee Limited from 16 April 2008 to 30 April 2008, which would not have any significant landfill gas impacts on site to the E&M contractor, Biwater Man Lee Limited.

For the landfill gas monitoring, no readings were monitored at Pumping Station by LGT technician in this month since no excavation work and construction work are carried out by Biwater Man Lee Limited. In addition, weekly site inspections by Landfill Gas Team were carried out on 3, 8 and 15 April 2008.

No exceedance of monitoring parameters was found and no deficiency was found during the site inspections in April 2008. Thus, the work activities and mitigation measures were in compliance with the environmental protection regulations, contract requirement and the requirement of the environmental permit.

The monthly EM&A meeting was held on 10 April 2008 with all of the parties (DSD, Civil and E&M contractors, LGTs, and the IC(LG)) involved.

There was no complaint received in April 2008.

There was no reporting change during the reporting month.

Weekly monitoring program of EM&A was completed due to no further site works subject to EM&A requirement.

1 Introduction

This is the eleventh monthly Environmental Monitoring and Audit (EM&A) Report for the Drainage Services Department Contract No. DE/2005/04 entitled "Supply and Installation of Electrical and Mechanical Equipment for Upgrading of Ting Kok Road Pumping Station No. 5". The report was prepared by the Landfill Gas Team, Kingsford Environmental (H.K.) Limited, of the E&M Contractor, Biwater Man Lee Limited. This report is submitted to the Client, the Drainage Services Department, and Independent Checker (Landfill Gas), CH2M HILL Hong Kong Limited, for the project. In addition, this report is to be submitted to the EPD in accordance with the requirement of the environmental permit (EP-212/2005) and Report on Landfill Gas Hazard Assessment as per section 8 (EM&A).

This report only presents the results of the landfill gas monitoring and environmental auditing of the project activities regarding to the E&M equipment site work conducted in the month of April 2008. The various landfill gas parameters at the beginning of each half working day for E&M installation work (i.e. morning and afternoon) was monitored and auditing works include mainly regular site inspections for verification of the mitigation measures implementation as recommended in the Report on Landfill Gas Hazard Assessment was conducted by LGT.

The EM&A contact information for the key personnel are shown in Appendix 1.

The action and limited levels, event/action plan and complaint procedure are shown in Appendix 2.

2 Work Activities during the Month

The works activity for April 2008 included the defect rectification, outstanding minor works and provision of emergency call services for the Pumping Station was conducted.

The activities and dates of occurrence of each activity are summarized below in Table 1. The Construction Programme is shown in Appendix 3.

Table 1: Work Activities for April 2008

<i>Pumping Station</i>	
Defect	1 Jan '08 – 30 Apr '08
Outstanding minor works and provision of emergency call services	1 Mar '08 – 30 Apr '08

3 Status of Environmental Protection

Noise, air quality, water quality and waste/ chemicals Management

The job nature of the E&M contractor, Biwater Man Lee Limited, is mainly for installation of E&M equipment inside the Pumping Station, all hand-held's breakers, bulldozer, concrete lorry mixer, dump truck and hand-held's poker, vibratory would not be used so that the impact from noise and dust would be low. For water quality, appropriate mitigation measure e.g. regular removal of stagnant water and/or spraying larvicide will be implemented in place, if necessary.

The minor construction waste materials are preferred to be removed promptly from the site. No inert C&D materials will be generated from installation of E&M equipment whereas the minor non-inert C&D waste will be disposed to Tseung Kwan O landfill. Note that the C&D materials should be reduced, reused and recycled if possible, before disposal. Any substance identified as chemical waste would be disposed of properly by a licensed collector. A trip ticket system for the disposal of C&D waste should be conducted as required by the Particular Specification. Rubbish bins are provided on-site for collecting general refuses as necessary. The general refuse would be removed regularly and disposed to landfills by a licensed collector. A proper record of each waste disposal, including the new bar-coded disposal delivery form, would be kept to verify proper handling and disposal.

Landfill Gas Hazard

The installation of E&M equipment is carried out inside the Pumping Station and no excavation work will be carried out by Biwater Man Lee Limited.

Appropriate mitigation measure will be implemented in place e.g. smoking and naked flames are not allowed within the working area and worker is not allowed to work alone at any time in the confined area. In addition, Safety Officer, trained to familiar with gas detection equipment and landfill gas-related hazards, is appointed on site. Also, safe portable instruments, appropriately calibrated and capable of measuring the methane (0-100% LEL and 0-100% by volume), carbon dioxide (0-100%) and oxygen (0-21%) is provided.

For the confined space, welding, flame-cutting or other hot works are only allowed to be carried out in accordance with the requirement of the Report on Landfill Gas Hazard Assessment as per section 6 and mitigation measures for the construction phase extracted from Appendix G of the Project Profile ("Implementation Schedule for Landfill Gas Hazard Mitigation Measures").

The temporary site offices or buildings that have enclosed spaces with the capacity to accumulate landfill gas, then they are located on an area which has been proven to be free of landfill gas and monitoring manually by the Safety Officer or an approved and appropriately qualified person to ensure that hazardous concentration of landfill gas does not occur; or be raised clear of the ground. Also, adequate fire extinguishing equipment, fire-resistant clothing and breathing apparatus (BA) sets will be made available on site. Lastly, periodic environmental monitoring report with LFG control measures evaluation during construction phase should be provided by contractor.

The status of permits and licenses is attached in Appendix 4. The implementation status of mitigation measures for the construction phase extracted from Appendix G of the Project Profile (“Implementation Schedule for Landfill Gas Hazard Mitigation Measures”) is attached in Appendix 5.

4 Landfill Gas Monitoring Results

The landfill gas monitoring by Landfill Gas Team was carried out in April 2008 to monitor the landfill gas parameters comprising methane, carbon dioxide and oxygen. Note that temperature is also recorded. The gas analyzer equipment (Manufacture: Gas Data Model GFM410 Landfill, Serial No. 10239) was used for landfill gas monitoring and the calibration records for the equipments used for landfill gas monitoring are attached in Appendix 6.

The site works of the E&M contractor, Biwater Man Lee Limited, is mainly for installation of E&M equipment inside the Pumping Station and no excavation work is carried out by Biwater Man Lee Limited. Therefore, monitoring locations were selected at Pumping Station.

M3 (existing manholes) monitored by civil contractor (Maeda) was dismantled in December 2007. A manhole MH3 (approximately 4m depth and 3m next to M3) of the new system was constructed and monitored by civil contractor to serve the same purpose of M3. A manhole MH3 was recorded monthly for the analysis of potential risk of hazardous gases and hence; identify any adverse impacts arising from the boreholes in order to protect the workers from potential hazards. Note that M1 (new deep borehole) monitored by civil contractor was dismantled in September 2007, which would not have any significant impacts on site to the E&M contractor, Biwater Man Lee Limited. For the site work of Biwater Man Lee Limited, no excavation work is carried out. In addition, before carrying out any E&M installations, landfill gas monitoring would be performed at the designated working area each day; i.e. morning and afternoon, to ensure the safety at work.

The results are summarized below in Table 2 and the layout plan and the monitoring location code is shown in Appendix 7.

Table 2: Monitoring results by civil contractor (Maeda) at fixed location for April 2008

Fixed Monitoring Station	Date of measurement	Flammable gas Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Temp. (°C)	Remarks
MH3	18-Apr-08	0.0	0.0	20.7	25.0	1m depth
MH3	18 – Apr-08	0.0	0.0	20.7	25.0	3m depth

The landfill gas monitoring was carried out according to the working area of E&M installation / operation (inside Pumping Station) at the beginning of each half working day for the E&M installation / operation works (i.e. morning and afternoon).

For this month, the landfill gas was monitored at Pumping Station by LGT technician. No readings were monitored at Pumping Station since no excavation work and construction work are carried out by Biwater Man Lee Limited. The on-line automatic gas detection system was installed at Pumping Station and the calibration record for on-line automatic gas detection system used for landfill gas monitoring is attached in Appendix 7.

No exceedances for Action or Limit Level at any locations were recorded during the reporting period. Refer to field measurement recording sheet and monitoring location in Appendix 7.

5 Site Inspection

For this month, site inspections by an LGT technician were carried out on 3, 8 and 15 April 2008.

The site locations inspected were marked on a site layout plan and the location code was recorded on the checklist. The site layout plan is shown in Appendix 8.

The works activity for April 2008 included the defect rectification, outstanding minor works and provision of emergency call services for the Pumping Station was conducted.

No deficiency was found during this month. Inspection checklists are annexed in Appendix 8. Whereas all of the environmental aspects were inspected in the work areas, the most applicable descriptions are addressed below.

Odour

In this month, a deodourizer with a forced ventilation system was installed to remove odour during operation and maintenance of E&M equipment at Pumping Station. The exhaust air from pumping station was ventilated through a deodourizer capable of achieving at least 99% hydrogen sulphide gas removal, prior to discharge at a direction away from the sensitive receivers. The test report for deodourizer system is attached in Appendix 9.

Landfill Gas Hazard

Daily field measurement recording sheet was checked and no exceedances for Action or Limit Level at any locations were recorded during the reporting period. In addition, no hot work was carried out in this month. Adequate fire extinguishing equipments were made available on site.

Waste Management

Refuse bins and waste storage/sorting area were provided for the collection of general refuse and sorting the C&D materials. No C&D waste was disposed during this reporting month by the licensed waste collector.

6 Summary of Deficiencies and Remedial Actions

There was no deficiency noted from the site inspections in April 2008.

7 Summary of Complaints and Remedial Actions

No complaint was received in April 2008. In the event of complaints, the procedure for handling of the complaints is detailed in the Report on Landfill Gas Hazard Assessment.

8 Monthly Landfill Gas Monitoring and Auditing for the Coming Months

Weekly monitoring program of EM&A was completed due to no further site works subject to EM&A requirement.

9 Conclusions and Comments

There have been no exceedances in A/L level at any monitoring locations. In addition, the required weekly site inspections have been conducted. No deficiencies, i.e. non-compliances, were noted.

Table 2: Monitoring results by civil contractor (Maeda) at fixed location for April 2008

Fixed Monitoring Station	Date of measurement	Flammable gas Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Temp. (°C)	Remarks
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Appendix 1

EM&A Contact Information for Key Personnel

EM&A Contact Information for Key Personnel

Name	Title	Telephone	Fax
Mr. Thomas Jim (BML)	Site Agent	26712350 / 90804998	26712351
Mr. Tommy Lo (BML)	Deputy Site Agent	24162828	24136278
Mr. Thomas Jim (BML)	Site Waste Manager / Co-ordinator	26712350 / 90804998	26712351
Mr. K. C. Lau (BML)	Site Supervisor	97569316	24136278
Mr. Stanley Lau (KEL)	LGT Leader	2612-2817	2614-7012
Ms. Angela Lau (KEL)	LGT Assistance	2612-2817	2614-7012
Mr. C. W. Tse (DSD)	Engineer's Representative	25947309	28278532
Mr. K. S. Lee (CH2M)	The Independent Checker (Landfill Gas)	2507-2203	2507-2293

Appendix 2

Action and Limited Levels, Event/Action Plan and Complaint Procedure

Event and Action Plan (EAP) for Landfill Gas

The Event and Action Plan for landfill gas detected in utilities and any on-site areas following construction are shown in the table below.

Event and Action Plan for Landfill Gas

Parameter	Level	Action
Oxygen	<19%	- Ventilate to restore oxygen to >19%
	<18%	- Stop works - Evacuate personnel/prohibit entry - Increase ventilation to restore oxygen to >19%
Methane	>10% LEL (i.e. >0.5% by volume)	- Post "No Smoking" signs - Prohibit hot works - Ventilate to restore methane to <10% LEL
	>20% LEL (i.e. >1% by volume)	- Stop works - Evacuate personnel/prohibit entry - Increase ventilation to restore oxygen to <10% LEL
Carbon Dioxide	>0.5%	- Ventilate to restore carbon dioxide to <0.5%
	>1.5%	- Post "No Smoking" signs - Prohibit hot works - Increase ventilate to restore carbon dioxide to <0.5%

Landfill Gas Complaint

Landfill gas complaint should be referred to the LGT Leader for action. The LGT Leader should undertake the following procedures upon receipt of any complaint:

- log complaint and date of receipt onto the complaint database and inform the IC(LG) and the ER immediately;
- investigate the complaint to determine its validity, and assess whether the source of the problem is due to works activities;
- identify mitigation measures in consultation with the IC(LG) if a complaint is valid and due to works;
- advise the Contractor if mitigation measures are required;
- review the Contractor's response to identified mitigation measures, and the updated situation;
- if the complaint is transferred from the EPD, submit interim report to the EPD on status of the complaint investigation and follow-up action within the time frame assigned by the EPD;
- undertake additional monitoring and audit to verify the situation if necessary, and review that circumstances leading to the complaint do not recur;
- report investigation results and subsequent actions to complainant (if the source of complaint is EPD, the results should be reported within the timeframe assigned by the EPD); and
- record the complaint, investigation, the subsequent actions and the results in the monthly EM&A reports.

Appendix 3

Construction Programme

Appendix 4

Permits

Same as in June 2007 Report

Appendix 5

Environmental Requirements and Implementation Status

Appendix G
Implementation Schedule for LFG Hazard Mitigation Measures

Section	Environmental Protection Measures	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines						
6.1	<p>Safety Officer, trained in the use of gas detection equipment and landfill gas-related hazards, should be appointed on site throughout the ground works phase. The Safety Officer should be provided with intrinsically safe portable instruments, appropriately calibrated and capable of measuring the following gases in the ranges indicated:</p> <table style="margin-left: 40px;"> <tr> <td>methane</td> <td>0-100% LEL and 0-100% by volume;</td> </tr> <tr> <td>carbon dioxide</td> <td>0-100%;</td> </tr> <tr> <td>oxygen</td> <td>0-21%</td> </tr> </table>	methane	0-100% LEL and 0-100% by volume;	carbon dioxide	0-100%;	oxygen	0-21%				<i>Code of Practice on Safety and Health at Work in Confined Space,</i>
methane	0-100% LEL and 0-100% by volume;										
carbon dioxide	0-100%;										
oxygen	0-21%										
6.2	No smoking and naked flames should be allowed.	Within the work site	Contractor	Construction	<i>Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97)</i>						
6.2	No worker should work alone at any time in the confined area or any excavation trenches.										
6.2	Construction equipment should be equipped with a vertical exhaust at least 0.6m above ground level and/or with spark arrestors.										
6.2	Electrical motors and electrical extension cords should be explosion-proof or intrinsically safe.										
6.2	Welding, flame-cutting or other hot works should only be carried out in trenches or confined spaces when controlled by a 'permit to work' procedure, properly authorized by the Safety Officer.										
6.2	Forced ventilation should be required for workers, if in a trench deeper than 1m.				<i>Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97)</i>						

Appendix G
Implementation Schedule for LFG Hazard Mitigation Measures

Section	Environmental Protection Measures	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
6.2	During piping assembly or conducting construction, all valves/seals should be closed as installed to prevent the migration of gases through the pipeline/conduit. Forced ventilation and gas monitoring should be performed before staff entering and working in large diameter pipe.				
6.2	The Safety Officer should set down the monitoring frequency and areas prior to commencement of construction works.				
6.2	Daily and routine monitoring should be carried out in all excavations.				
6.2	All measurements in excavations should be made with the extended monitoring tube located not more than 10mm from the exposed ground surface. Monitoring should be performed properly to make sure that the area is free of landfill gas before any man enters the area.				
6.2	<p>For excavations deeper than 1m, measurements should be carried out:</p> <ul style="list-style-type: none"> • at the ground surface before excavation commences; • immediately before any worker enters the excavation; • at the beginning of each half working day (i.e. morning and afternoon) for the entire period the excavation remains open; and • periodically through the working day whilst workers are in the excavation. 	Within the work site	Contractor	Construction	<i>Landfill Gas Hazard Assessment Guidance Note (EPD/TR8/97)</i>
6.2	<p>For excavations between 300mm and 1 m deep, measurements should be carried out:</p> <ul style="list-style-type: none"> • directly after the excavation has been completed; and • periodically whilst the excavation remains open. 				

Appendix G
Implementation Schedule for LFG Hazard Mitigation Measures

Section	Environmental Protection Measures	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
6.2	The landfill gas precautionary measures involved with excavation and piping works should be included in the Safety Plan.				
6.3	The cracks on the ground level at the working area should be monitored during ground-works construction				
6.4	<p>Where there are any temporary site offices, or any other buildings that have enclosed spaces with the capacity to accumulate landfill gas, then they should either:</p> <ul style="list-style-type: none"> • Be located on an area which has been proven to be free of landfill gas and monitored manually by the Safety Officer or an approved and appropriately qualified person to ensure that hazardous concentration of landfill gas does not occur; or • Be raised clear of the ground. If buildings are raised clear of the ground, a minimum, clear separation distance should be 500mm. 	Within the work site	Contractor	Construction	<i>Landfill Gas Hazard Assessment Guidance Note (EPD/TRS/97)</i>
6.5	Such offices or buildings should be provided with some kinds of control of gas by mechanical means e.g. forced ventilation using fans or blowers.				
6.6	Adequate fire extinguishing equipment, fire-resistant clothing and breathing apparatus (BA) sets should be made available on site.				
6.7	Periodic environmental monitoring report with LFG control measures evaluation during construction phase should be provided by contractor and submitted to SP/DSD and EPD.				

Appendix G
Implementation Schedule for LFG Hazard Mitigation Measures

Section	Environmental Protection Measures	Location	Implementation Agent	Implementation Stage	Relevant Legislation & Guidelines
7.1	When service voids, manholes or inspection chambers within the proposed site are entered for maintenance, monitoring and a checklist system of safety requirements should be performed before entry	Manhole/ chamber			
7.2	A procedure should be developed as part of the station operation to respond to gas detector alarms. The detection system should be maintained and calibrated regularly in accordance with the manufacturer's recommendations. In the event of a power failure, the detectors should have an 8-hour battery back-up system, and the procedures should indicate for manual monitoring in the station in the event of prolonged power failure (of longer than 8 hours).	Pumping station			
7.3	Forced ventilation should be used if methane of more than 0.5 % (by volume) in the internal atmosphere (e.g. in service voids, manholes, inspection chambers or rooms as mentioned above) is detected.		DSD	Operation	<i>Code of Practice on Safety and Health at Work in Confined Spaces</i>
7.4	No person should enter or remain in any confined spaces or trenches where the carbon dioxide concentration exceeds 1.5 % (by volume).				
7.5	Oxygen concentration should be monitored and no person should enter or remain in any confined spaces or trenches where the oxygen content of air has fallen below 18 % by volume.	Manhole/ chamber/ Pumping station			
7.6	All the access to these confined spaces would be restricted only to authorize personnel who should be aware of the LFG hazard. No member of general public should be permitted or allowed to access these confined spaces, manholes or inspection chambers.				

Appendix 6

Calibration records for equipment used for landfill gas monitoring

- **The Portable gas analyzer equipment
(Manufacture: Gas Data Model GFM410 Landfill)**
- **The on-line automatic gas detection system
(Model: Crowcon Gasmonitor System)**

TEST DATE AND CONDITIONS	
Date	27/07/2007
Atmospheric Pressure	996 mB
Ambient Temp	19 °C
Enviroics Serial No.	3268

GAS DATA LTD

Pegasus House
Seven Stars Estate
Wheler Rd
Coventry
CV3 4LB
Tel 02476303311 Fax 02476307711



GFM410 FINAL INSPECTION & CALIBRATION CERTIFICATE

INSTRUMENT DETAILS	
Serial No	Customer
10239	science international corporation

INSTRUMENT CHECKS			
Keyboard	✓	Pump Flow	400 cc/min
Display Contrast	✓	Pump Flow @ -200mB	300 cc/min
Clock Set / Running	✓	S/W Version	G410.0022/0004
Labels Fitted	✓	Recalibration Date	27/7/2008

GAS CHECKS							
Calibration Gas		Instrument Gas Channels Read					
Gas Type	Applied Conc.	CH4 (%)	tol. (% vol.)	CO2 (%)	tol. (% vol.)	O2 (%)	tol. (% vol.)
N2	100%	0.0	0.0	0.0	0.0	0.0	+0.1
CH4	5 %	5.1	+/-0.3	0.0	0.0	0.0	+0.1
	60%	59.2	+/-3.0	0.0	0.0	0.0	+0.1
CO2	5%	0.0	0.0	4.9	+/-0.3	0.0	+0.1
	40%	0.0	0.0	39.4	+/-3.0	0.0	+0.1
AIR (20.9% O2, 400ppm CO2)	100%	0.0	0.0	0.0	+0.1	20.9	+/-0.5

PRESSURE CHECKS							
Calibration Pressure		Instrument Pressure Channels Read					
Pressure @	Applied Pressure	Atmospheric [Ap] (mB)	tol. (mB)	Static [Sp] (mB)	tol. (mB)		
All ports	current atmospheric	996	+/-2.0	0	0.0		
Ap port (internal)	+800mB(a)	800	+/-5.0	0	0.0		
	+1200mB(a)	1200	+/-5.0	0	0.0		
Gas IN port	+400mB(g)	996	n/a	400	+/-2.0		
	-400mB(g)	996	n/a	-399	+/-2.0		

TEST DATE AND CONDITIONS	
Date	27/07/2007
Atmospheric Pressure	996 mB
Ambient Temp	19°C
Enviroics Serial No.	3268

GAS DATA LTD

Pegasus House
 Seven Stars Estate
 Wheler Rd
 Coventry
 CV3 4LB
 Tel 02476303311 Fax 02476307711



GFM410 FINAL INSPECTION & CALIBRATION CERTIFICATE

FLOW CHECKS

OPTIONAL GAS CHECKS								
Calibration Gas		Instrument Gas Channels Read						
Gas Type	Applied Conc.	Label Range						tol. (% vol.)
N2	100%							0.0
								+/- 5.0
								+/- 5.0
								+/- 5.0
								+/- 5.0
								+/- 5.0

OPTIONAL TEMPERATURE CHECK

PACKING						
Instrument	✓	AC Powered Battery Charger	UK	EUR	US	
Gas Sample Pipe	✓	Manual	✓	Carry Case		✓
Spares Pot	✓	Allen Key	✓			
USB Lead		PC Software				
Vane Anemometer		Extra Items				

TESTED *ps sarkaria*

APPROVED *[Signature]*



Calibration Certificate

Number: CCS/57011

Customer: Biwater Man Lee Limited
 Location: DSD Ting Kok Road Sewage Screening Plant
 Contact Person: Mr. Jim
 Model: Crowcon Gasmonitor System
 Auxiliary System: NA

Channel Number	Sensor Type	Measuring Range	Alarm 1	Alarm 2	Alarm 3	Calibration Gas	Result
Rack 1							
1	CH4	0-100%LEL	20	40	100	50%LEL	Passed
2	CO2	0-2%v/v	0.5	1.5	2	1.5%v/v	Passed
3	O2	0-25%v/v	19	18	17	17%v/v	Passed
4	CH4	0-100%LEL	20	40	100	50%LEL	Passed
5	CO2	0-2%v/v	0.5	1.5	2	1.5%v/v	Passed
6	O2	0-25%v/v	19	18	17	17%v/v	Passed
7	CH4	0-100%LEL	20	40	100	50%LEL	Passed
8	CO2	0-2%v/v	0.5	1.5	2	1.5%v/v	Passed
9	O2	0-25%v/v	19	18	17	17%v/v	Passed
Rack 2							
1	CH4	0-100%LEL	20	40	100	50%LEL	Passed
2	CO2	0-2%v/v	0.5	1.5	2	1.5%v/v	Passed
3	O2	0-25%v/v	19	18	17	17%v/v	Passed
4	CH4	0-100%LEL	20	40	100	50%LEL	Passed
5	CO2	0-2%v/v	0.5	1.5	2	1.5%v/v	Passed
6	O2	0-25%v/v	19	18	17	17%v/v	Passed
7	CH4	0-100%LEL	20	40	100	50%LEL	Passed
8	CO2	0-2%v/v	0.5	1.5	2	1.5%v/v	Passed
9	O2	0-25%v/v	19	18	17	17%v/v	Passed

Remarks: Instrument PASSED – fit for service.

Authorized Signature

Technical Department

Date: 10th Jan 2008

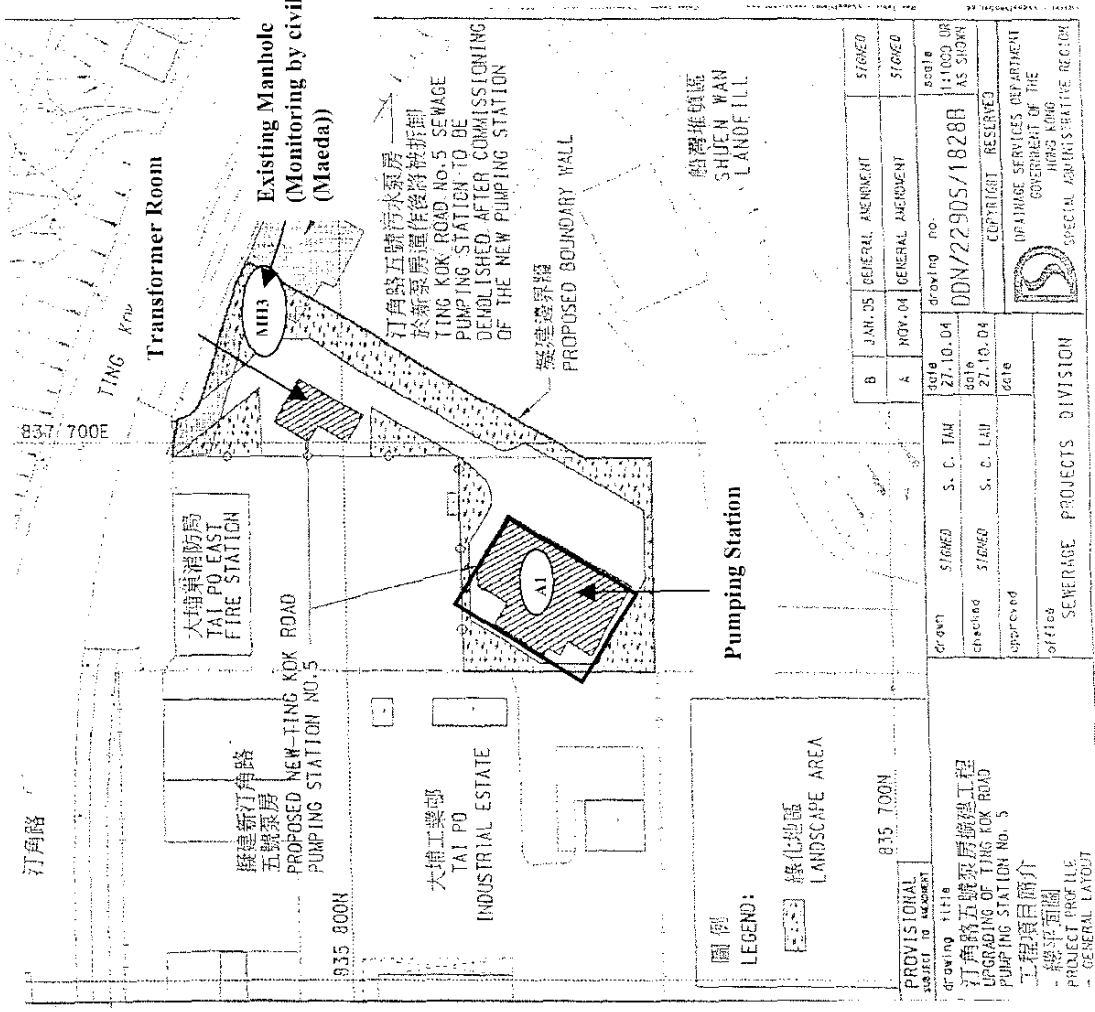


FireMark Hong Kong Limited
 Unit 901, 9/F., Lai Sun Commercial Center, 6&0 Cheung Sha Wan Road, Kowloon,
 Hong Kong
 Tel : (852) 2751 8871 Fax : (852) 2751 8806

Appendix 7

Landfill Gas Monitoring Results

Upgrading Ting Kok Road Pumping Station No. 5 – E&M Works Landfill Gas Monitoring – April 2008 Site Layout

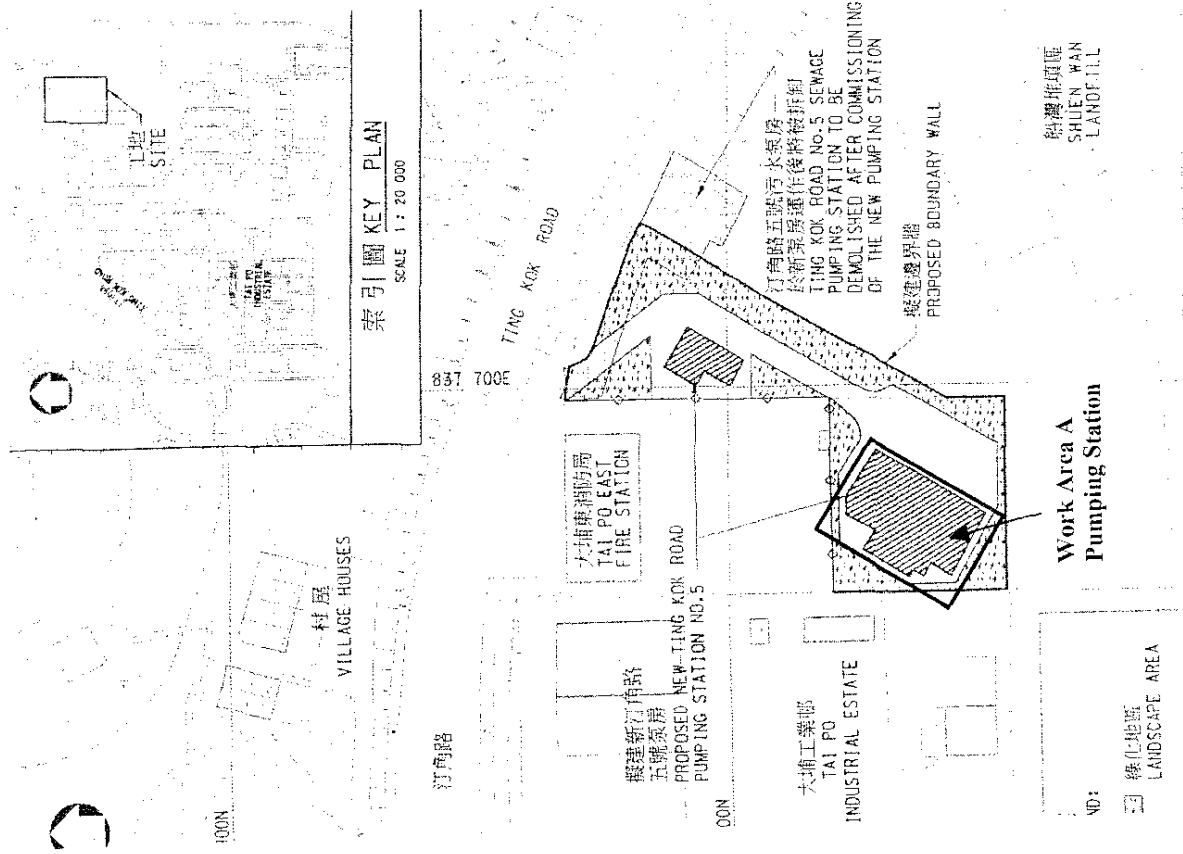


圖例 LEGEND: 綠化地區 LANDSCAPE AREA		PROVISIONAL SUBJECT TO REWORK drawing title 汀角路五號泵房擴建工程 UPGRADING OF TING KOK ROAD PUMPING STATION No. 5 工程項目簡介 PROJECT PROFILE - GENERAL LAYOUT	
drawn	checked	approved	office
drawn	checked	approved	office
S. C. TAI	S. C. LAU	SEWERAGE PROJECTS DIVISION	
27.10.04	27.10.04	DRAWING NO. DDN/229DS/1828B	
27.10.04	27.10.04	SCALE 1:1000 OR AS SHOWN	
JAN. 05 GENERAL AMENDMENT B		NOV. 04 GENERAL AMENDMENT A	
STAGED		STAGED	
COPYRIGHT RESERVED DEPARTMENT OF THE GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION			

Appendix 8

Site Inspection Checklists

Upgrading Ting Kok Road Pumping Station No. 5 – E&M Works EM&A Site Inspection – April 2008 Site Layout



UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

ENVIRONMENTAL SITE INSPECTION CHECKLIST

Inspection Date: April 3, 2008 Time: 16:30 - 17:15

Inspected By:

DSD Representative: /

E&M Contractor Representative: Thomas Sim

Landfill Gas Team Inspector: Angela Lau

Weather

Condition Sunny Fine Overcast Drizzle Rain Storm Hazy

Temperature °C Humidity %

Wind Calm Light Breeze Strong Direction

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
Water Quality							
1	Rainwater silt removal	A	✓				
2	Groundwater silt removal				✓		
3	Large object				✓		
4	Sewage discharged				✓		
5	Fuel/chemical storage				✓		
6	Storage area condition				✓		
7	Clean-up actions	✓			✓		
Waste Disposal							
8	Construction wastes	A	✓				
9	Licensed waste collector				✓		
10	Removal of construction wastes		✓				
11	Waste storage areas		✓				
12	Windblown litter/dust				✓		
13	Waste disposal permits				✓		
14	Licensed waste disposal facilities	✓	✓				

UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
15	Careful design, planning & good site management	A			✓		
16	Chemical wastes handling				✓		
17	Chemical waste storage				✓		
18	Condition of chemical waste storage area				✓		
19	Disposal of chemical wastes				✓		
20	General refuse		✓				
21	Chemical waste separation				✓		
22	Strictly prohibited of refuse burning		✓				
23	Environmental Permit and other documents on-site		✓				
24	Environmental Permit and license displayed		✓				
25	Waste records	✓	✓				
Landfill Gas Hazard							
26	S.O., trained in the use of gas detection equipment and landfill gas-related hazards.	A	✓				
27	No smoking and naked flames		✓				
28	No worker work alone at confined area or excavation trenches.		✓				
29	Welding, flame-cutting or other hot works in trench or confined spaces controlled by a 'permit to work'		✓				
30	Forced ventilation for trench deeper than 1m				✓		
31	Enclosed spaces of temporary site offices, or any other building				✓		
32	Provided control of gas by mechanical means				✓		
33	Adequate fire extinguishing equipment, fire-resistant clothing and breathing apparatus	✓	✓				

UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
34	Periodic environmental monitoring report with LFG control measures evaluation	B	✓				

Summary / Remarks⁽⁴⁾

- No major site activity was observed during the site inspection.

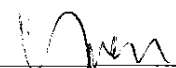
- No particular observation during the site inspection.

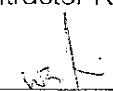
(Note: Refer to attached site layout)

Signatures

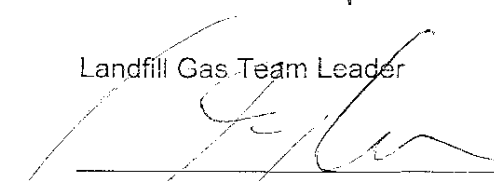
DSD Representative

E&M Contractor Representative


 Name: YIP TUNG LING


 Name: LUI WAI 4/1/07

Landfill Gas Team Leader


 Name: Stanley Lau

- (1) Refer to Site Inspection Checklist Attachment for complete description (Summarized Project Profile and Environmental requirement) of referenced mitigation measure or requirement.
- (2) Indicate exact locations as indicated (by code) on the attached site layout.
- (3) Note actions/plans and responsible party regarding any non-compliance in this column.
- (4) To be filled out by the Landfill gas team.

UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

ENVIRONMENTAL SITE INSPECTION CHECKLIST

Inspection Date: April 8, 2008 Time: 11:30 - 12:00

Inspected By:

DSD Representative: /

E&M Contractor Representative: Thomas Jim

Landfill Gas Team Inspector: Angela Lau

Weather

Condition Sunny Fine Overcast Drizzle Rain Storm Hazy

Temperature °C Humidity %

Wind Calm Light Breeze Strong Direction

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
Water Quality							
1	Rainwater silt removal	A	✓				
2	Groundwater silt removal				✓		
3	Large object				✓		
4	Sewage discharged				✓		
5	Fuel/chemical storage				✓		
6	Storage area condition				✓		
7	Clean-up actions	↓			✓		
Waste Disposal							
8	Construction wastes	B	✓				
9	Licensed waste collector				✓		
10	Removal of construction wastes		✓				
11	Waste storage areas		✓				
12	Windblown litter/dust				✓		
13	Waste disposal permits				✓		
14	Licensed waste disposal facilities	↓	✓				

**UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
ENVIRONMENTAL MONITORING AND AUDIT**

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
15	Careful design, planning & good site management	A			✓		
16	Chemical wastes handling				✓		
17	Chemical waste storage				✓		
18	Condition of chemical waste storage area				✓		
19	Disposal of chemical wastes				✓		
20	General refuse		✓				
21	Chemical waste separation				✓		
22	Strictly prohibited of refuse burning		✓				
23	Environmental Permit and other documents on-site		✓				
24	Environmental Permit and license displayed		✓				
25	Waste records	✓	✓				
Landfill Gas Hazard							
26	S.O., trained in the use of gas detection equipment and landfill gas-related hazards.	A	✓				
27	No smoking and naked flames		✓				
28	No worker work alone at confined area or excavation trenches.		✓				
29	Welding, flame-cutting or other hot works in trench or confined spaces controlled by a 'permit to work'		✓				
30	Forced ventilation for trench deeper than 1m				✓		
31	Enclosed spaces of temporary site offices, or any other building				✓		
32	Provided control of gas by mechanical means				✓		
33	Adequate fire extinguishing equipment, fire-resistant clothing and breathing apparatus	✓	✓				

UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
34	Periodic environmental monitoring report with LFG control measures evaluation	A	✓				

Summary / Remarks⁽⁴⁾

- No major site activity was observed during the site inspection.

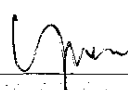
- No particular observation during the site inspection.


(Note: Refer to attached site layout)

Signatures

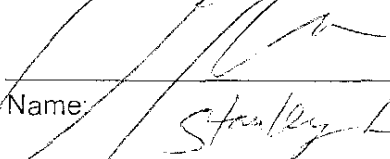
DSD Representative

E&M Contractor Representative


 Name: YUEN WING CHING


 Name: LUI WAI SING

Landfill Gas Team Leader


 Name: Stanley Lau

- (1) Refer to Site Inspection Checklist Attachment for complete description (Summarized Project Profile and Environmental requirement) of referenced mitigation measure or requirement.
- (2) Indicate exact locations as indicated (by code) on the attached site layout.
- (3) Note actions/plans and responsible party regarding any non-compliance in this column.
- (4) To be filled out by the Landfill gas team.

UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

ENVIRONMENTAL SITE INSPECTION CHECKLIST

Inspection Date: April 15, 2008 Time: 15:45 - 16:15

Inspected By:

DSD Representative: [Signature]

E&M Contractor Representative: Thomas Lim

Landfill Gas Team Inspector: Angela Lau

Weather

Condition Sunny Fine Overcast Drizzle Rain Storm Hazy

Temperature °C Humidity %

Wind Calm Light Breeze Strong Direction

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
Water Quality							
1	Rainwater silt removal	A	✓				
2	Groundwater silt removal				✓		
3	Large object				✓		
4	Sewage discharged				✓		
5	Fuel/chemical storage				✓		
6	Storage area condition				✓		
7	Clean-up actions	✓			✓		
Waste Disposal							
8	Construction wastes	A	✓				
9	Licensed waste collector				✓		
10	Removal of construction wastes		✓				
11	Waste storage areas		✓				
12	Windblown litter/dust				✓		
13	Waste disposal permits				✓		
14	Licensed waste disposal facilities	✓	✓				

UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾	
			Yes	No	N/A	Unk		
15	Careful design, planning & good site management	A			✓			
16	Chemical wastes handling				✓			
17	Chemical waste storage				✓			
18	Condition of chemical waste storage area				✓			
19	Disposal of chemical wastes				✓			
20	General refuse		✓					
21	Chemical waste separation				✓			
22	Strictly prohibited of refuse burning		✓					
23	Environmental Permit and other documents on-site		✓					
24	Environmental Permit and license displayed		✓					
25	Waste records	✓	✓					
Landfill Gas Hazard								
26	S.O., trained in the use of gas detection equipment and landfill gas-related hazards.	A	✓					
27	No smoking and naked flames		✓					
28	No worker work alone at confined area or excavation trenches.		✓					
29	Welding, flame-cutting or other hot works in trench or confined spaces controlled by a 'permit to work'		✓					
30	Forced ventilation for trench deeper than 1m				✓			
31	Enclosed spaces of temporary site offices, or any other building				✓			
32	Provided control of gas by mechanical means				✓			
33	Adequate fire extinguishing equipment, fire-resistant clothing and breathing apparatus	✓	✓					

UPGRADING TING KOK ROAD PUMPING STATION NO. 5 – CONTRACT NO. DE/2005/04
 ENVIRONMENTAL MONITORING AND AUDIT

Ref. No. ⁽¹⁾	Brief Description of Mitigation	Site Location ⁽²⁾	Activity Compliance				Action Required/ Responsible Party ⁽³⁾
			Yes	No	N/A	Unk	
34	Periodic environmental monitoring report with LFG control measures evaluation	A ₁	✓				

Summary / Remarks⁽⁴⁾

- No major site activity was observed during the site inspection.

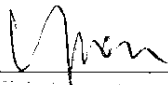
- No particular observations during the site inspection.


(Note: Refer to attached site layout)

Signatures

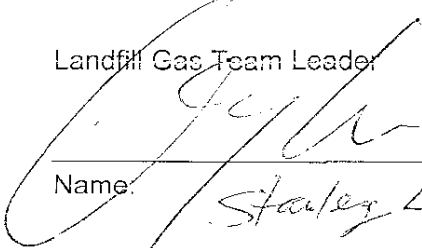
DSD Representative

E&M Contractor Representative


 Name: YUEN Kwai


 Name: Paul Lam SING

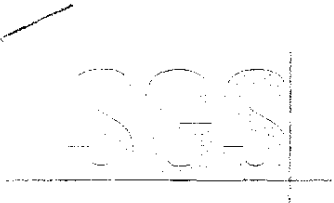
Landfill Gas Team Leader


 Name: Stanley Lam

- (1) Refer to Site Inspection Checklist Attachment for complete description (Summarized Project Profile and Environmental requirement) of referenced mitigation measure or requirement.
- (2) Indicate exact locations as indicated (by code) on the attached site layout.
- (3) Note actions/plans and responsible party regarding any non-compliance in this column.
- (4) To be filled out by the Landfill gas team.

Appendix 9

Test Report for Deodourizer System



Test Report

No. 2002355/IEQ

Date : Feb 18 2008

Page 1 of 2

AROMATRIX TECHNOLOGIES (HONG KONG) LTD
UNIT 403, YEE KUK INDUSTRIAL CENTRE,
555 YEE KUK ST., CHEUNG SHA WAN, KLN.

SGS Job No. : 2612856

1. Sampling and Analytical Methodologies

Report on the performance test of Deodourising System installed at Tai Po Industrial Estate. The performance of the units is expressed as the hydrogen sulphide removal efficiency. The sampling of hydrogen sulphide was conducted on 11 Januray 2008.

2. Sample Identification

SGS Sample ID	Sample Labelling	Date of Sampling	Parameter
A0801033	Inlet	11 January 2008	H ₂ S
A0801034	Outlet	11 January 2008	H ₂ S

3. Sampling and Analytical Methodologies

The sampling and analytical methodologies were based on ISC 3rd ed. 701 "Determination of Hydrogen Sulphide Content of the Atmosphere" in Methods of Air Sampling and Analysis.

The hydrogen sulphide gas was injected. Hydrogen sulphide gas was collected simultaneously at the designated inlet and outlet of the Deodouring Unit. A sampling train consisted of a sampling probe, a midiget impinger containing cadmium hydroxide (STRactan 10 was added to the cadmium hydroxide slurry prior to sampling to minimize the photo-decomposition of cadmium sulphide precipitate) and a calibrated SKC air sampler was employed for air sampling. A measured volume of air was aspirated through the cadmium hydroxide solution in the midiget impinger at a flow rate of about 1.0 LPM.

3. Sampling and Analytical Methodologies (Continue) / 4. Result

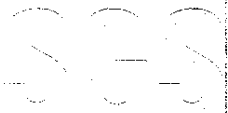
Please refer to the following page(s).

Singed for and on behalf of
SGS Hong Kong Ltd.


BROOK WANG
TECHNOLOGIST

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only. This document cannot be reproduced except in full without prior approval of the Company.



Test Report

No. 2002355/IEQ

Date : Feb 18 2008

Page 2 of 2

3. Sampling and Analytical Methodologies (Continue)

Samples were stored in an ice box (i.e. about 4 °C) and sent to laboratory immediately. The analysis of Hydrogen sulphide (H₂S) was conducted by outside laboratory as competent

The removal efficiency of hydrogen sulphide (H₂S) of the Deodouring Unit was calculated according to the following equation.

$$\text{Removal efficiency \%} = \left\{ 1 - \frac{H_2S \text{ concentration at outlet, ppb}}{H_2S \text{ concentration at inlet, ppb}} \right\} \times 100\%$$

4. Test Result

SGS Sample ID	Description	Hydrogen Sulphide (ppb)	Average Efficiency (%)
A0801033	Inlet	110000	>99.93%
A0801034	Outlet	<75	

*** End of Report ***

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only. This document cannot be reproduced except in full, without prior approval of the Company.

Appendix 10

Deficiency Investigation Reports

(Not Applicable)

Appendix 11

Complaint Reports

(Not Applicable)